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renew
TEES VALLEY LIMITED

Sustainable Building and Future Proofing

Workshop briefing Note[1]

The aim of this note is to provide …

- Introduce relevant statutory national and regional policies and strategies impacting on sustainable building;
- An introduction to a range of sustainable construction standards with signposts for additional reading / research;
- Indicate the different relative levels of environmental performance / sustainability;
- Show the areas of overlap between different means of rating development;
- Suggest where the individual rating systems / standards have a significant impact on the integrated design process;

Introduction

There is a level of professional confusion over what is meant by sustainable / green design and the range of seemingly objective design measures and standards. Some are focused on strategic aspects of design, dealing with planning policy, neighbourhood development and mixed communities. Other standards have a thematic emphasis on resilience and flexibility, operating at the scale of the individual buildings or group of buildings. The simple number of standards and composite standards being produced by different organisations is indicative of the dynamic nature of sustainability. Many of the more 'aspiration' standards are published as working drafts and often in direct response to the perceived low benchmarks being set as statutory requirements and / or the speed of response within the development and construction industries to address the challenge of climate change and sustainable development. In addition, many of the 'standards' which have been adopted by public sector organisations are effectively 'franchises' from different agencies, networks, charities and private companies. In short, there are competing standards and definitions for 'long life, loose fit and low energy design'.

This paper is a brief overview of a range of statutory and voluntary standards and assessments that have specific relevance[2] to the construction industry within the north-east and the Tees Valley. They are presented in a broad 'aspiration' order identifying relevant policy / statutory standards and leading to other notionally higher [or lower carbon] standards.

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[2] This summary is not comprehensive but presented as an overview of the most relevant policy, standards and design tools as currently available. An overview of these standards alongside international and national policy framework is also contained within; Shaw, Robert., Marrion, Jonathan and Webb, Robert [2005] *Sustainable Energy by Design: A TCPA 'by design' guide for sustainable communities* [Town and Country Planning Association, London]; a joint publication by the TCPA and CABE.

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Securing the Future

At a national level, the UK Government[3] has reviewed its strategy for sustainable development. This strategy is focused on directing action, with a strong commitment throughout to environmental equality, community involvement and action at a local level. This strategy also placed the concept of environmental limits at its heart. Promoting Sustainable Consumption and Production [SCP] is now one of five strategic priorities for DEFRA[4].

Arising from and supported by this strategy, is the work on promoting *sustainable communities*, as one of four government priorities alongside addressing climate change, promoting sustainable consumption and protecting natural assets. Through the promotion of 'sustainable communities', key significance is given to the role of the statutory planning system, where the government is "… placing sustainable development at the heart of the land use planning system and at the core of new planning guidance" [p11] and linking delivery to Local Development Frameworks. There are consistent principles of community involvement and reducing environmental / spatial inequalities through this guidance. This explicit approach supported through the reform of the statutory planning system[5] is to make the planning system simplifier, pro-active in promoting sustainable development and flexible and more dynamic to address opportunities and issues of managing change.

While the approach to sustainable communities is significant to urban regeneration in Tees Valley, there are other key impacts expected especially as part of the response to addressing climate change and meeting government commitments[6]. One is the promotion of energy efficiency measures in new construction and refurbishment projects. In parallel to this is the promotion of non-fossil fuel alternatives.

Planning Policy Statement 22: Renewable Energy

This indicates that the Government believes that renewable energy developments are capable of being accommodated throughout England where the technology is viable and environmental, social and economic impacts can be addressed in a satisfactory manner. To promote this it requires that;

- Regional and local plans should contain policies designed to promote and encourage, rather than restrict, the development of renewable energy resources;
- Targets for renewable energy generation should be set out in regional spatial strategies, as indicated in the Energy White Paper;
- Local planning authorities should set criteria in their plans against which planning applications for renewable energy projects will be judged rather than identifying any specific locations suitable for certain types of development;

[3] UK Government [March 2005] *Securing the Future: Delivering UK Sustainable Development strategy – The UK Government Sustainable Development Strategy Cm 6467* [HMSO, Norwich].
[4] Ecological Footprint analysis [One Planet Living] measures the impact of human activity upon nature. The Footprint expresses the land area that is required to feed, provide resources, produce energy, assimilate waste, and to re-absorb the greenhouse gases produced by our use of fossil fuels. More information available from; www.wwf.org.uk
[5] Office of the Deputy Prime Minster [2004] *Planning Policy Statement 12: Local Development Frameworks* [TSO, London].
[6] These include the *Kyoto Protocol* target to reduce the UK greenhouse gas emissions by 12.5% below the 1990 level over 2006-20012 and reducing CO2 emissions by 20% below 1990 levels by 2010.

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- Planning authorities may set policies in their plans that require a percentage of the energy to be used in new developments to come from on-site renewable energy;
- Proposals for renewable energy developments need to be considered carefully in areas on national and international importance for landscape and nature conservation/wildlife, and should only be granted planning permission where the criteria set out in PPS22, other guidance and legislation are met.

Regional Spatial Strategy

The policy context for the North East of England and the Tees Valley sub-region is set out in three principle policy documents; [1] the Regional Sustainable Development Framework [RSDF]; [2] Regional Economic Strategy [RES]; and [3] Regional Planning Guidance [RPG]. The later is currently being replaced by a Regional Spatial Strategy. Currently the RSS has undergone an Examination in Public with the Panel Report currently under consideration by the Regional Assembly and the Government Office for the North East[7]. This contains several relevant aspects of sustainable design and renewable energy with a discussion[8] on the role of Energy and Renewable Targets and recommendations for;

- Retaining / renaming Policy 39 on sustainable construction;
- Requiring local planning authorities to include a policy on onsite renewable energy that includes a minimum target of 10% of energy from renewable sources;
- Recommends that the Regional Assembly [as the Regional Planning Body] provides a definition within the RSS Glossary

In short, if the Panel's recommendations are adopted all local planning authorities within the North East will have set this target and define both the scale at which this operates and what is understood as a renewable source in the meeting of a minimum target.

The Merton Rule[9]

Some of the precedent for this definition and clarification has been undertaken by the London Borough of Merton. The London Borough of Merton was one the first local planning authorities to formalise the governments renewable energy targets in its adopted UDP, setting the target for the use of onsite renewable energy to reduce annual CO_2 emissions for all new major developments in the borough by 10%. The Government has clarified PPS22 wording on the wider take-up of Merton-type pro-renewables planning policies. The Government now "expects all authorities" to put in

[7] Full details of the EIP Panel are available from the Government Office for the North East [www.gos.gov.uk/gone] with the full documentation on the RSS available for the Regional Assembly [www.northeastassembly.gov.uk].
[8] *Regional Spatial Strategy for the North East: Examination in Public, March – April 2006 Panel Report* [July 2006]; Para 8.21 extract "Durham CC, FoE, CABE and others expressed support for Policy 40 c) which was generally perceived as a response to the need to decouple economic growth and energy demand. However, it was suggested that some authorities fear that local implementation might put them at a competitive disadvantage against those authorities that adopt a more relaxed approach to the scale of development that would attract the minimum requirement for 10% of their energy supply to be from embedded renewable sources. It was proposed that this might be overcome by the RSS requiring strategies plans and programmes to set local level size thresholds for all major new developments."
[9] More information from: www.themertonrule.org.uk

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place such policies and is writing to all Chief Planning Officers urging them to do so. In emerging new style regional spatial strategies and local development frameworks there has been a strong take-up of the policy in PPS22 on the use of on-site renewables in new developments. For those authorities preparing new plans where an appropriate stage in plan making has been reached, 26 out of 29 surveyed have devised policies to secure on-site renewables in new developments[10].

Other examples of this approach promoted and adopted independently by local planning authorities include supplementary planning guidance in London for sustainable design and construction, that established an essential standard of "Carbon emissions from the total energy needs [heat and power] of the development should be reduced by at least 10% by the on-site generation of renewable energy."[11] and in Oldham[12], where the Unitary Development Plan which only permits "new development if its design … contributes to the creation of development that is more sustainable by optimising standards of environmental performance it is designed to reduce its environmental impact by [i] achieving high standards of energy efficiency, [ii] making some provision to utilise sources of renewable energy"[13] setting a similar requirement for a minimum target of 10% on-site provision. Both of these examples are emergent policies effectively establishing a precedent for localising aspects of the Kyoto Protocol principles and targets. These approaches are underpinned and supported [including through public examination] by national and regional policies including the *Climate Change Programme*[14], the *Energy White Paper*[15] and national *Planning Policy Statement* on Renewable Energy that actively encouraged local planning authorities to require a percentage of energy of major developments from on-site renewable sources[16].

The revised Deposit Draft RUDP for Oldham also included a new policy NR3.3, to increase the exploitation of solar water heating, photovoltaics and other "micro-scale" renewables in new buildings, both residential and non-residential. The requirement, for 10% of total predicted energy requirements to be provided from renewable energy sources, was restricted in the policy to residential developments comprising 10 or more units, and non-residential developments exceeding 1000m^2 gross floorspace – beginning to define the scale at which on-site renewable becomes a statutory requirement.

[10] Extract from speech by the Minister for Planning, *Yvette Cooper 8 June 2006.*
[11] p23 in; Greater London Authority [March 2005] *Sustainable Design and Construction – The London Plan [Spatial Development Strategy for Greater London] – Draft Supplementary Planning Guidance* [GLA, London].
[12] Oldham is one of nine national Pathfinder Housing Market Renewal areas identified in the Sustainable Communities Plan, and the 10% renewal energy target for significant new development was not considered *'stifling'* to new developments within the MHR area [OMBC November 2004 p33].
[13] p29 in; OMBC [October 2003] *Oldham Replacement Unitary Development Plan – Revised Deposit Draft* [Oldham Metropolitan Borough Council, Oldham].
[14] The *UK Climate Change Programme* is now under consultation review and under the responsibility of the *Department for Environment, Food and Rural Affairs*.
[15] Department of Trade and Industry [February 2003] *Our Energy Future – Creating a low carbon economy Cm 5761* [HMSO, Norwich].
[16] p10 in; Office of the Deputy Prime Minister [October 2004] *Planning Policy Statement 22 [PPS22] Renewable Energy* [TSO, Norwich].

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Building Regulations

The UK ***2006 Building Regulations [Parts L and M]*** control the quality and performance of new buildings including standards for conservation of fuel / power [part L] and access to buildings [part M][17]. The recent revisions [coming into effect from 6th April 2006] based upon the EU Energy Performance of Building Directive[18] require 20% improvements to energy efficiency on the previous standards. These deal with;

- CO_2 emissions [Kg of CO_2 per m^2 floor area per annum based on SAP - heating installation / hot water supply, active solar systems and other heating / cooling and electricity systems based on renewable energy sources, electricity produced by CHP];
- Performance of the building fabric [thermal characteristics of the building shell and internal partitions];
- Consideration of solar shading and summer overheating [building orientation, natural lighting, passive solar systems and solar protection];
- Insulation and air-tightness;
- Information for building users.

In addition to the above technical framework extracted from the EU Directive the Feasibility study should advise on the usage of the building [as it relates to energy including process loads, catering etc] and on the wastes produced by the building usage and advise on the recycling and waste to energy options.

Lifetime HOMES

A voluntary standard defined by the Joseph Rowntree Foundation[19] in 1999, ***Lifetime Homes*** is about access and future flexibility to allow properties to become adaptable to different life stages where the levels of personal mobility changes. The Lifetime Homes Standard for accessible homes meets basic access requirements [compliant with the Part M Building Regulations] and promotes flexibility for future adaptation. It does impact on some aspects of external space design [particularly car parking and levels] as well as ground floor uses and areas of communal access. This has been seen as relevant to encouraging a level of social diversity in age within mixed sustainable communities. This standard has been validated through consumer studies and market testing to be largely positive [or understood as not having a significant

[17] The current 2006 Building Regulations are available for download from www.planningportal.gov.uk with the most relevant for sustainable design being Office of the Deputy Prime Minister [2006 edition] *The Building Regulations 2000: Conservation of Fuel and Power L1A conservation of fuel and power in new dwellings* [NBS / RIBA Enterprises, London]; [2006 edition] *The Building Regulations 2000: Conservation of Fuel and Power L1B conservation of fuel and power in existing dwellings* [NBS / RIBA Enterprises, London]; [2006 edition] *The Building Regulations 2000: Conservation of Fuel and Power L2A conservation of fuel and power in new buildings other than dwellings* [NBS / RIBA Enterprises, London]; [2006 edition] *The Building Regulations 2000: Conservation of Fuel and Power L2B conservation of fuel and power in existing buildings other than dwellings* [NBS / RIBA Enterprises, London]; Office of the Deputy Prime Minister [2004 edition] *The Building Regulations 2000: Access to and use of Buildings M* [NBS / RIBA Enterprises, London].

[18] Directive 2002/91/EC – 16 Dec 2002 – On the Energy Performance of Buildings.

[19] More information available from www.jrf.org.uk in the publication: Carroll, Caitriona., Cowans, Julie and Darton, David [Eds.] [1999] Meeting Part M and designing Lifetime Homes [Joseph Rowntree Foundation, York]. Post occupancy survey views are recorded in; Sopp, Leslie and Wood, Liz [2001] *Living in a Lifetime Home: A survey of residents' and developers' views* [Joseph Rowntree Foundation York].

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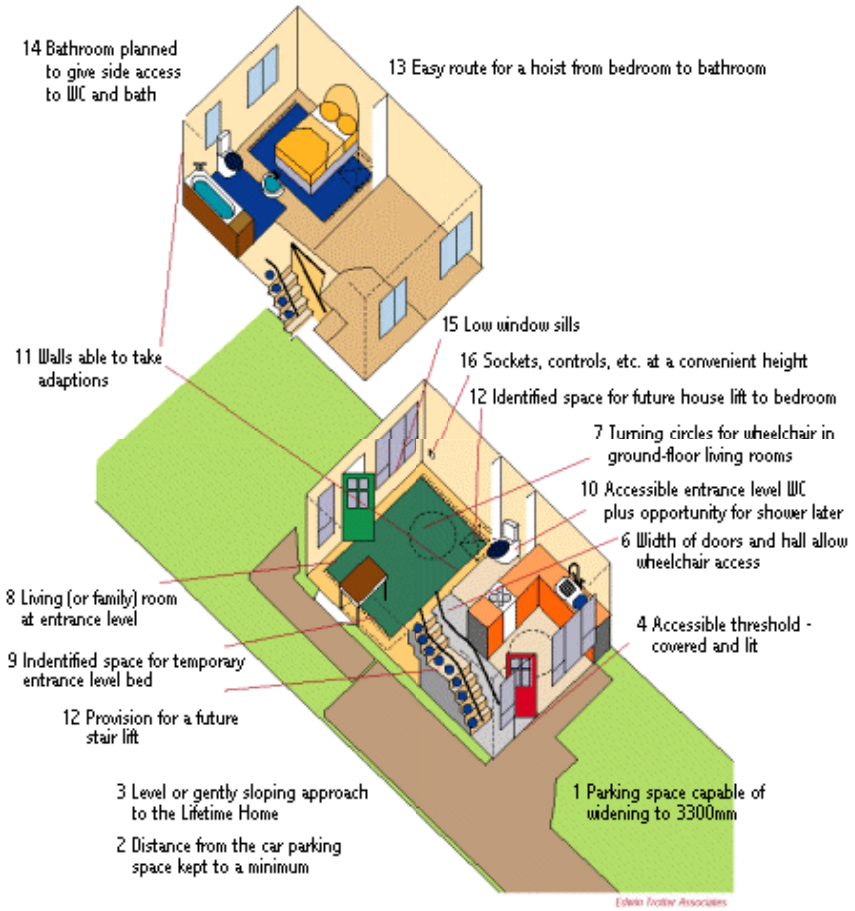
effect on personal lifestyle outside of the additional provision for circulation space] and non-onerous requirements for the development industry [Sopp and Wood 2001].



[Extract from Carroll *et al*. 1999 p12. **16 principles** that go to make up the Lifetime Homes Standard and local examples from the Cambrian estate, Walker Riverside, Newcastle; Bellway Homes / Places for People Group; images Newcastle City Council / CABE]

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Secured by Design is the UK police force's 'flagship' promotion of an integrated design approach around;

- Environmental quality / ownership [including landscape planning / site management with detailed consideration of specific security measures and specifications for property / building typologies];
- Promoting natural surveillance;
- Access routes [footways, cycleways and roads];
- Public open space [linked to management];
- Lighting.

That considers personal safety and security of property. The separate guidance for new homes and multiple occupancy buildings addressing shared access, parking and communal areas within buildings. Details on the approach and method of accreditation can be found at www.securedbydesign.com or through reference to the local architectural liaison officer within Cleveland Police [www.cleveland.police.uk]

Decent Homes Standard is a central government defined standard [initially established 2000] for social housing as integral to all public sector regeneration funding and applicable to all Registered Social Landlords. This 'decency' is defined as;

- Meets current minimum statutory standards;
- Reasonable state of repair;
- Reasonable facilities and services;
- Reasonable degree of thermal comfort [including effective insulation and efficient heating system].

More information and guidance on meeting this standard[20] is available from the DCLG at www.communities.gov.uk and examples of projects and implementation of this standard from the Housing Corporation[21].

The Housing Corporation ***Scheme Development Standards*** are guidelines for addressing design and quality in RSL housing schemes. It deliberately incorporates and refers to other familiar 'thematic' guides and standards, looking at;

- External environment [layout, parking, access, including location / site planning for community facilities with reference to urban design guidance[22] and external reference to *CABE Design Review* service];

[20] Department of Communities and Local Government [June 2006 update] *A Decent Home: Definition and guidance for implementation* [DCLG, London].
[21] Details at www.housingcorp.gov.uk Further post-occupancy research has been carried out; Ormerod, Marcus and Thomas, Pam [206] *Implementing Decent Homes Standards: How housing associations are addressing accessibility issues* [Joseph Rowntree Foundation, York]; looking at the overlap between decent homes, accessibility and part M of the Building Regulations.
[22] As set out in; Llewelyn-Davies [August 2000] *Urban Design Compendium* [English Partnership and Housing Corporation, London]

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- Internal environment;
- Detailed consideration of flexibility and accessibility [referring to 'Lifetime Homes'];
- Safety and security [referencing 'secured by design'];
- Energy efficiency and sustainability [referring to 'Ecohomes'];
- Maintenance [including durability[23] and adaptability];

… and sets minimum measurable and qualitative 'standards' as a requirement for financial support from the Housing Corporation[24]. Assessment is by means of supporting information provided by the scheme designer / promoter.

Building for Life[25] is a collaborative award system developed by the Home Builders Federation and the Commission for Architecture and the Built Environment to assess and validate design quality for residential developments. This is a largely qualitative assessment based upon peer review by ***Building for Life***[26] against a set of four broad criteria and twenty questions addressing …

- Character [distinctiveness, architectural quality, layout, legibility, landscape];
- Road, parking and pedestranisation [priorities, car parking, integration, security];
- Design and construction [locality, public realm, standards, MMC, flexibility];
- Environment / community [public transport, sustainability, variety, facilities].


[Local example of 'Gold Building for Life Award' Highgate, Durham City; RPS Architects]

[23] Assessment of durability of materials through 'building life plans' information.
[24] Housing Corporation [April 2003] *Scheme Development Standards* [Housing Corporation, London].
[25] Assessment against each of the individual twenty criteria and how this can be evidenced [implying provision of supporting information within any design statement / statement of compliance with design code] is taken from a working draft undertaken by CABE's Policy Team.
[26] The *Building for Life Standard* identifies 20 urban design criteria adopted by the Deputy Prime Minister, in the Sustainable Communities Plan, as the benchmark for the quality of new homes - awarding a gold 80% or silver 70% standard based on assessment against the 20 criteria.

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In effect it brings together consideration of sustainability, flexibility, security and place-making with references to other 'thematic' standards mentioned above. Assessment is undertaken initially at pre-construction stage[27] and on completion and is intended to provide a benchmark for briefing / commissioning and as iterative tool within the design process. It is also a useful commercial / marketing tool upon completion[28].


['Silver Building for Life Award' Staithes South Bank, Gateshead; Ian Darby Partnership]

EcoHomes

The BREEAM [Building Research Establishment Environmental Assessment Method] is a tool that allows the owners, users and designers of buildings to review and improve environmental performance throughout the life of a building. It is a widely accepted and respected scheme that sets a benchmark for environmental performance and provides measurable benefits. It is independent, authoritative and is based on many years of construction and environmental research carried out at BRE, together with the input and experience of the construction and property industries, government and building regulators.


[Examples of 'Ecohomes' excellent, Tor Grove, North Greenwich; Millennium Village phase 1, Ralph Erskine; images Newcastle University / CABE]

[27] Ideally prior to outline planning as part of pre-application discussions. The Building for Life can also provide a useful structure for the preparation of Design and Access Statement for mixed use / residential developments.
[28] Full details and case study projects are available at www.buildingforlife.org

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While the Government's mandatory standards for all development is the building regulations a number of government bodies and other authorities have started using BREEAM to set standards. ECOHOMES is the Homes version of BREEAM.

English Partnerships National *Quality and Price Standards* are a composite of several of the 'thematic' standards that address design quality and explicitly environmental sustainability[29] incorporating 'Ecohomes', 'Building for Life' and 'Lifetime Homes'.

LEED [Leadership in Energy and Environmental Design] is a green building rating system 'franchise' provided by support and assessment by the U.S Green Building Council. Used initially as a national standard for the USA, it is beginning to have a wider global impact[30] as it is underpinned by strong commercial evidence for the economic benefits [referred to the triple bottom line justification] for achieving improved environmental performance. It is gained by consideration of the key design issues of …

- Site planning;
- Water use and efficiency;
- Energy efficiency and renewable energy;
- Conservation of materials / resources;
- Indoor environmental quality.


['platinum' standard, Lake View Library Los Angeles Epicentre Arts Centre, Boston; images USGBC]

The rating system under each of these five broad headings covers renovation and new build for commercial and residential developments as well as a more strategic rating system for neighbourhood development[31] and has become an important

[29] English Partnerships [May 2006] Quality and Price Standards in the use of development competitions and site disposal tendering [English Partnerships, London].
[30] The standard is being licensed and used to rate buildings / developments in many other countries including; Australia, Canada, China, France, India, Brazil, Japan, Spain, Mexico, Italy and Chile.U.S. Green Building Council [October 2005] *An Introduction to the U.S. Green Building Council LEED Green Building Rating System®.*
[31] Developed in partnership with the Congress for New Urbanism www.cnu.org

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'baseline' reference for many public sector commissions within the U.S. It acts as a briefing / design tool and as a guide for appropriate technical solutions. It requires an accredited third party validation to achieve specific standards[32].

Department for Communities and Local Government

The ***Code for Sustainable Building*** is being promoted as a voluntary initiative by the Department of Communities and Local Government to require buildings to use energy, water and material resources more efficiently as well as promoting practices and materials designed to safeguard occupants' health and well being. The aim is to become the 'single' / composite national standard for sustainabel building in all sectors of the construction industry – initially as a voluntary standard and through grwoing consumer demand as future requirenments.

Like the LEED standard, it will have clear associations with the enhanced markability of propertries meeting the code [through ethical investment, financial saving in the maintenance / management of the property] and ownership / understanding by builders, consumers and public bodies alike[33]. It remains work in progress.

European ***'Passive House'*** Standard is the world's leading standard in energy efficient construction: Energy saved on heating is 80% compared to conventional standards with the energy requirement for heating [space and water] is typically lower than 10 to 20 kWh/[m²a][34]. Consideration within the design process of the key principles of …

- Orientation to maximise ***passive solar gain***, make it well ***insulated*** and ***air tight*** [avoiding thermal bridging and air leakage at openings / windows];
- Design of the ***energy system*** [combining ventilation and heat recovery with supplementary air heating];
- Extension of energy ***efficiency*** appliances throughout the dwelling;
- Meeting remaining energy demand from ***renewable*** sources [off site and / or micro generation] – something easy to achieve;

… that can be applied to new build or retro-fitting to existing buildings and the methodology can be applied to non-residential uses.

[32] Each of the sections has minimum requirements and then allows for points to be awarded for additional environmental benefits, allowing for flexibly and 'trade-offs' between potentially competing requirements through the design process. There are four levels / standards – certified, silver, gold and platinum – based upon overall credits scored.
[33] At the beginning of 2005 the *Code for Sustainable Building* was being tested as demonstration schemes across the Thames Gateway and within a HMR pathfinder area.
[34] Full details of standard, design principles, project / building component examples and wider professional network / contacts are available at www.passiv.de

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The Passive House Standard is achieved by assessment from the passive house institute using a standard software package available in the UK from PassivHausUK [www.passivhaus.org.uk] managed by the Building Research Establishment.


[new build residential 'Passiv Haus', Vauban, , Wohnen & Arbeiten / Michel Giehse Architektur, / office buildings, Stadt-Paura, Vienna architekten Dl Albert P Böhn; CABE and www.passivehausprojekte.de]



[before / after images of refurbishment of single family home Bayern, Architekt Martin Endhardt; refurbishment of 1910 dwelling "Große Barlinge Passiv Haus", Hannover, Nicole von Oesen and Helmut Wein; images www.passivehausprojekte.de[35] and CABE]

[35] Case study website of over 1000 recorded Passive House projects with comparative climates to the North East of England, including visuals, construction methods, costs and component suppliers.

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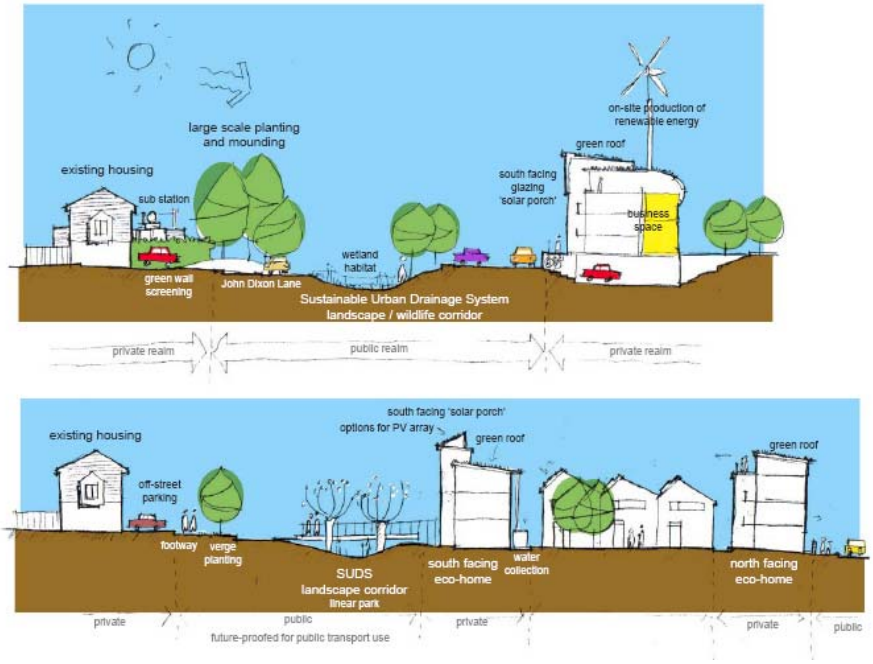

[While there are no assessed 'Passive House' standard dwelling within the UK, the current regeneration of Central Park, Darlington includes a requirement for at least five demonstration homes that meet Passive House standards as part of the first phase of residential development. Developer short-listing is on-going by TVR; images Tees Valley Regeneration / CABE@ Tees Valley]

The ***Zed Standard*** has been published as a discussion draft by Bill Dunster Architects, based upon the lessons learnt from the development of BedZed and to challenge the aspirations / expectations of the 'Code for Sustainable Building'. It is distinctive in the extent to which it facilitates the sustainable use of the development with regard to food production, recycling, water use and the impact of transport – based on the principle of diminishing returns, where CO_2 emissions, and environmental impact can be more easily reduced through lifestyle changes rather than physical design measures.

[Bedzed and BowZed, London Bill Dunster Architects; images Newcastle University and CABE]

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